A. Carboxylic acid

1. Acyl chloride + → carboxylic acid + HCl
2. Ester + → carboxylic acid + alcohol
3. Amide + → carboxylic acid + NH_4^+
4. Carboxylic acid + Na or Mg →
5. Carboxylic acid + alkali →
6. Carboxylic acid + carbonates →
7. Carboxylic acid + $LiAlH_4$, dry ether/H^+ →
8. Carboxylic acid + alcohol/conc. H_2SO_4 →
9. Carboxylic acid + PCl_5 or $SOCl_2$ →
10. Carboxylic acid + conc. NH_3/reflux →
11. HCOOH + conc H_2SO_4 →
12. HCOOH + $KMnO_4/H^+$ →
13. $(COOH)_2$ + $KMnO_4/H^+$ →
14. $(COOH)_2$ + conc. H_2SO_4 →

B. Acyl chloride

1. Acyl chloride + H_2O →
2. Acyl chloride + alcohol →
3. Acyl chloride + NH_3 →
4. Acyl chloride + primary amine →
5. Acyl chloride + secondary amine →

C. Ester & Amide

1. Ester + H^+/reflux →
2. Ester + OH^-/reflux →
3. Ester + $LiAlH_4$, dry ether/H^+ →
4. Amide + H^+/reflux →
5. Amide + OH^-/reflux →
6. Amide + $LiAlH_4$, dry ether/H^+ →
7. Amide + P_2O_5 or P_4O_{10} →
8. Amide + HNO_2/0-5°C →